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EXAMINER

FERNANDEZ RIVAS, OMAR F

ART UNIT

PAPER NUMBER

2129

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/018,571

Applicant(s)

KITANO ET AL.

Examiner

Omar F. Fernández Rivas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date A1, A2, A3.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to an AMENDMET entered on August 15, 2006.
2. The Office Actions of March 9, 2005, October 6, 2005 and May 15, 2006 are incorporated into this Final Office Action by reference.

Status of Claims

3. Claims 19 and 21 have been amended. Claims 29-39 are new. Claims 18-39 are pending on this application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 30 and 36 recite the limitation "...each of **the 2N networks**..." in line 6.

There is insufficient antecedent basis for this limitation in the claim.

Claims 30 and 36 recites the limitation "...from **the generated 2N x M networks**" in line 8. There is insufficient antecedent basis for this limitation in the claim.

Response to Applicant's arguments

5. In light of the amendments made to claims 19 and 21, the rejection under 35 U.S.C. §112 has been withdrawn for these claims.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

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Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 18-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The computer system must set forth a practical application of judicial exception to produce a real-world result. *Benson*, 409 U.S. at 71-72, 175 USPQ at 676-77. The invention is ineligible because it has not been limited to a substantial practical application.

For a claimed invention to be statutory the claimed invention must produce a useful, concrete, and tangible result. The Courts have found that subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon is not patentable. See, e.g., *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874) ("idea of itself is not patentable, but a new device by which it may be made practically useful is"); *Warmerman*, 33 F.3d at 1360, 31 USPQ2d at 1759.

For a claimed invention to be statutory under 35 U.S.C. 101, the claims must have the FINAL RESULT (not the steps) produce a useful (specific, substantial, AND credible), concrete (substantially repeatable/ non-unpredictable), AND tangible (real world/ non-abstract) result.

If the specification discloses a practical application but the claim is broader than the disclosure such that it does not require the practical application, then the claim must be amended. A claim that recites a computer that solely calculates a mathematical formula is not statutory.

In the present case, claims 18-26 describe a method for operating a data processing system. The system adapts the parameters of network structures in a pool

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to produce network structures with a high degree of fitness to solve a given problem.

The claims provide the steps performed by the system to obtain these network structures. However, the result from performing the operations in the claims is not presented to a user or provided to an outside device so as to affect its operation, therefore no useful and tangible result is obtained from using the invention. The result produced by the invention is maintained inside the computer (not outputted), which is considered to be a manipulation of abstract ideas (not tangible).

Claims 27-39 describe subject matter similar to those of claims 18-26 and are rejected on the same basis.

Response to Applicant's arguments

7. The Applicant's arguments regarding the rejection under 35 U.S.C. §101 have been fully considered but are not persuasive.

In reference to Applicant's arguments:

Nevertheless, the Office Action fails to explain with particularly and clarity as to why method of operating a data processing system fails "to produce a real-world result" and is found to be nonstatutory subject matter, especially when claim 18 include the steps of providing an expression profile of a network, generating network structures allowing said expression profile, selecting network structures from said topology pool, adapting said parameters to said selected network structures, and computing said degrees of fitness, storing said networks represented by triplets resulting from steps above in a triplet pool, screening candidate networks from said triplet pool. Clarification is respectfully requested.

Claim 27 - As a rule, computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. Section 101 and must be examined under 35 U.S.C. Sections 102 and 103. In re Beauregard, 53 F.3d 1583, 35 USPQ2d 1383 (Fed. Cir. 1995). Independent claim 27 is drawn to a computer program embodied on a computer readable medium. However, the Office Action fails to explain with particularly and clarity as to why a computer program embodied on a computer readable medium found to be nonstatutory subject matter. Clarification is respectfully requested.

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Claim 28 - Independent claim 28 is drawn to a network estimation apparatus. However, the Office Action fails to explain with particularity and clarity as to why a network estimation apparatus is found to be nonstatutory subject matter. See *Ex parte Logan*, 20 USPQ2d 1465 (Bd. Pat. App. & Inter. 1991). Clarification is respectfully requested.

Examiner's response

As stated in the rejection under 35 U.S.C 101 above, for a claimed invention to be statutory under 35 U.S.C. 101, the claims must have the FINAL RESULT (not the steps) produce a useful (specific, substantial, AND credible), concrete (substantially repeatable/ non-unpredictable), AND tangible (real world/ non-abstract) result. The result from the claims is obtaining a network structure by adapting parameters of network structures selected from a population. There is nothing in the claim that outputs this result into the real world in a useful and tangible manner, such as displaying the results to a user or providing the result to an outside device so as to cause a change in its operation. The results are kept inside the computer and no use is given to it. Therefore the rejection under 35 U.S.C. 101 stands.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18-23 and 25-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Koza et al. (US Patent #5,148,513, referred to as **Koza**)

Claims 18 and 28

Koza anticipates a method of operating a data processing system (**Koza**: C52, claim 11, L1-2), the method comprising the steps of: providing an expression profile of a network, said network represented by triplets having a network structure (**Koza**: C7, L10-22; C16, L53-64; Examiner's Note (EN): a network is a combination of interrelated elements as described in the applications specifications on page 4, lines 15-17), parameters (**Koza**: C7, L10-16; C14, L13-34; C14, L42-50; EN: the arguments are parameters), and a degree of fitness (**Koza**: abstract, L5-11, C13, L37-48; C23, L53-60; Figs. 3A-3B); generating network structures allowing said expression profile, said generated network structures being stored in a topology pool (**Koza**: C21, L53-59; C23, L30-36; C52, claim 10; Figs 3A-3B; EN: creating an initial population is storing in a topology pool); selecting network structures from said topology pool, adapting said parameters to said selected network structures, and computing said degrees of fitness (**Koza**: C23, L30-68; C24, L1-10; C24, L53-68, C25, L1-4; Figs. 3A-3B; EN: performing the operations on the selected entities is adapting parameters. A fitness is assigned to each entity in the population); storing said networks represented by triplets resulting from steps above in a triplet pool (**Koza**: C13, L37-54; C23, L30-52; Figs. 3A-3B; EN: environmental and evolving populations are triplet pools); and screening candidate networks from said triplet pool, said screened candidate networks being stored in a candidate triplet pool (**Koza**: C23, L30-68, C24, L1-2; Figs 3A-3B; EN: selecting entities based on fitness is screening candidate networks. The selected entities (candidates) will form a candidate triplet pool).

Claim 19

Koza anticipates selecting N network structures from said topology pool (**Koza:** C23, L30-40; Figs. 3A-3B; EN: designating a population as an evolving population is selecting N networks from the topology pool (initial population)) and adapting M parameter sets to each of said selected N network structures, said M parameter sets having the highest degree of fitness with said expression profile (**Koza:** C23, L53-68; C24, L1-10; Figs. 3A-3B; EN: performing an operation on the selected entities based on highest fitness).

Claims 20 and 32, 33, 38 and 39

Koza anticipates estimating parameters using a process from the group consisting of a genetic algorithm and simulated annealing (**Koza:** C24, L3-10; Figs 3A-3B).

Claim 21

Koza anticipates reorganizing network structures of N networks in the triplet pool using a process from the group consisting of a genetic algorithm and simulated annealing (**Koza:** C24, L3-10; C24, L59-65; Figs 3A-3B; EN: performing any of these operation will alter the network structure of the selected entities); adapting parameter sets to each of said N reorganized network structures (**Koza:** C24, L3-68, C25, L1-20; EN: a genetic algorithm will adapt the parameters of the entities selected to generate a fit solution to a problem); and storing the N x M networks in said triplet pool, each of said N x M networks having one of said M parameter sets having high degrees of

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fitness (**Koza**: C23, L53-64; C26, L34-48; EN: by removing the entities with the lowest fitness, all of the entities in the population will have a high degree of fitness).

Claim 22

Koza anticipates selecting P triplets having degrees of fitness at or above a predetermined threshold value from among triplets in said triplet pool, left only said P triplets in the triplet pool as a result (**Koza**: C23, L53-64; C26, L34-38; EN: by removing the entities with the lowest fitness values, only the P triplets with the highest degree of fitness will be left in the pool. Some measure must be used to determine what a low degree of fitness will be).

Claims 23, 31 and 37

Koza anticipates searching the vicinity of said selected P triplet; and replacing said searched P triplets when finding a triplet of higher degree of fitness (**Koza**: C51, L53-60; EN: selecting programs (entities) from the population based on the highest fitness).

Claim 26

Koza anticipates the structure of said generated network structure is partially known (**Koza**: C16, L53-66).

Claim 27

Koza anticipates a computer program embodied on a computer readable medium comprising: code means adapted to perform all the steps of claim 18 when said program is run on a data-processing system (**Koza**: C52, L65-68, C53; L1-47; EN: if the

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process is performed in a computer, code means are needed so that the computer can perform its operations).

Claims 29, 34 and 35

Koza anticipates a method of operating a data processing system which estimates candidate networks that are descriptive of relationships between interrelated elements as a network and that, when data generated by said elements from said network is given, are capable of reproducing data based on said data given (**Koza**: C51, claim 1); said network being represented by a triplet comprising: a network structure, a parameter set, and a degree of fitness between said data given and data reproduced from the network structure and the parameter set (**Koza**: abstract, L5-11; C7, L10-22; C8, L37-46; C10, L65-68; C13, L37-48; C14, L13-34; C16, L53-64; C23, L53-60; Figs. 3A-3B), said method comprising the steps of: generating a plurality of candidate networks by producing network structures based on partially known network structures, which may allow for reproduction of said data given (**Koza**: C16, L53-66; C21, L53-59; C23, L30-36; C52, claim 10; Figs 3A-3B; EN: creating an initial population is generating candidate networks which will be reproduced by the GA), producing corresponding parameter sets and degrees of fitness, optimizing said networks utilizing the degrees of fitness (**Koza**: abstract; C22, L5-58; C23, L30-52; C51, L31-68, C52, L1-13; Figs. 3A and 3B), and storing the optimized candidate networks in a first memory means (**Koza**: abstract; C22, L5-58; C13, L29-68, C14, L1-3; C22, L3-58; C39, L4-55; EN: each population (environmental and evolving) must be stored in different memory locations. The environmental population is stored in first means); and

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narrowing down appropriate candidate networks from said networks stored in the first memory means, using data different from said given data and that can be generated from network structures which are mutants or crossovers (**Koza**: abstract; C22, L5-58; C13, L29-68, C14, L1-3; C22, L3-58; Figs. 3A and 3B), and storing the networks in a second memory means (**Koza**: abstract; C22, L5-58; C13, L29-68, C14, L1-3; C22, L3-58; C39, L4-55; evolving population is stored (second memory means)).

Claims 30 and 36

Koza anticipates selecting N network structures from the produced network structures (**Koza**: C24, L3-10; C24, L59-65; Figs 3A-3B), producing N network structures from said selected N network structures (**Koza**: C24, L3-10; C24, L59-65; Figs 3A-3B), adapting M parameter sets to each of the 2N networks utilizing degree of fitness to generate the networks (**Koza**: C24, L3-68, C25, L1-20; EN: a genetic algorithm will adapt the parameters of the entities selected to generate a fit solution to a problem), and selecting P networks of high degree of fitness from the generated 2N x M networks (**Koza**: C13, L29-54; C23, L53-64; Figs. 3A and 3B).

Response to Applicant's arguments

9. The arguments made by the Applicant regarding the rejection under 35 U.S.C. §102 have been fully considered but are not persuasive.

In reference to Applicant's arguments:

However, Koza fails to disclose, teach, or suggest screened candidate networks being stored in a candidate triplet pool.

In this regard, the Office Action fails to show the presence within Koza of a topology pool, a triplet pool, and a candidate triplet pool.

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Examiner's response:

The claims and only the claims form the metes and bounds of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. All of the features identified by the applicant have been anticipated by relevant sections of Koza above and the reasoning made by the Examiner has been provided. The intent of the word "triplet" has not been established in the claim.

However, the chromosomes (entities) described in the Koza reference, each have a composition of functions (network structure), a set of elements or arguments (parameter set) and each chromosome is assigned a value based on its performance (degree of fitness) (**Koza**: C8; L37-46; C10, L65-68, C11, L1-4; C13, L29-54; C14, L13-61; C24, L59-65; C51, claim 1; C52, claim 10), thus providing the "triplets" as disclosed in the Application's specification in page 7, paragraph 52. The Examiner reads the creation of an initial population as described in Koza as being a topology pool, the creation of an evolving population as being a triplet pool and selecting entities as creating a candidate pool (see **Koza**: Figs. 3A and 3B).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Koza as set forth above in view of Arci et al. (US Patent #5,761,381, referred to as **Arci**)

Claim 24

Koza does not teach producing a mutant triplet for each triplet from said triplet pool, a mutant pool storing said mutant triplet; evaluating a degree of fitness with a mutant profile for said mutant pool; and integrating said degrees of fitness for said mutant pool, if a candidate group having a degree of fitness above a certain value being chosen and stored in said candidate triplet pool.

Arci teaches producing a mutant triplet for each triplet from said triplet pool, a mutant pool storing said mutant triplet; evaluating a degree of fitness with a mutant profile for said mutant pool; and integrating said degrees of fitness for said mutant pool, if a candidate group having a degree of fitness above a certain value being chosen and stored in said candidate triplet pool (**Arci**: C3, L18-42; Fig. 2; EN: producing a set of new genotypes (mutant triplets) is producing (or storing in) a mutant pool. The new genotypes are assigned a fitness value and a selection process selects the best new genotypes and places them in the genotype pool).

It would have been obvious to one of ordinary skill in the arts at the time of the applicant's invention to modify the teachings of Koza by producing mutant triplets, evaluating the fitness of each mutant triplet and integrating the mutant triplet into the candidate triplet pool if its fitness is above a certain value as taught by Arci for the purpose of maintaining in the candidate pool only those triplets that have a high degree of fitness for solving a given problem.

Claim 25

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Koza anticipates said mutant triplet is produced by eliminating a gene and removing all bonds from said gene (**Koza**: C52, claim 2; **EN**: replacing a portion (gene) of the selected program is eliminating a gene).

Response to Applicant's arguments

11. The Applicant's arguments regarding the rejection under 35 U.S.C. §103 have been fully considered but are not persuasive.

In reference to Applicant's arguments:

In this regard, the Office Action fails to show the presence within *Arci* of a topology pool, a triplet pool, and a candidate triplet pool.

Examiner's response:

As stated above, the features stated in the argument above are taught by the Koza reference.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Claims 18-39 are rejected.

Correspondence Information

14. Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandez.rivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
Artificial Intelligence Art Unit 2129
United States Department of Commerce
Patent & Trademark Office

Monday, October 23, 2006

OPR

David Vincent 10/30/06
DAVID VINCENT
SUPERVISORY PATENT EXAMINER